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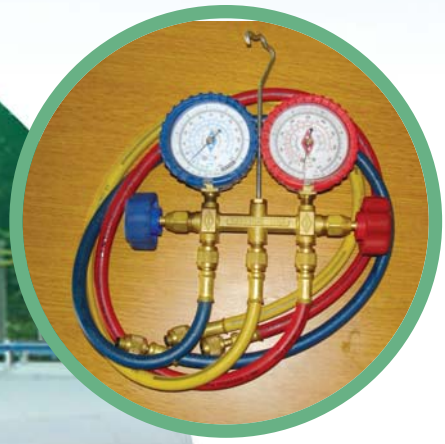
CLEAN REFRIGERANTS

FOR ENVIRONMENTAL SAFETY





Han Young Technochem Co., Ltd

http://www.technochem.co.kr

냉매설비분야



HCR-290

(R22 대체냉매)



■중대형 에어컨 및 냉장고
■공장기계 및 산업기계, 상업용 쇼케이스 호텔, 병원, 백화점등 대형건물의 칠러

구 분		HCR-290	HCFC-22
1. 분자량		44.1	86.48
2. 비등점(℃)		-42.1	-40.76
3. 0℃에서의 기화열(kj/kg)		342	234.12
4. 안정성	열적 안정성	안정적	안정적
	화학적 안정성	안정적	안정적
5. 부식성		없음	없음
6. 가연성(하한 & 상한, %)		2.2~9.5	없음
7. 자연발화온도(℃)		470	없음
8.독성		없음	없음
9. O,D,P(오존파괴지수 I)		0	0
10. G.W.P(지구온난화지수)		3이하	1,500
11. 윤활유		미네랄	미네랄
12. 비중		0.508	1.91
13. 포장단위		CAN-200g 실린더-5kg,10kg, 50kg, 450kg, 벌크-10,000kg	

HCR-290 특징

오존파괴지수가 "0"이고 지구온난화지수가 "3" 이하인 환경 친화적 냉매입니다. R22 를 사용하던 기기의 변경의 없이 그대로 대체하여 사용할 수 있습니다.

(다만, 대형칠러는 가스켓만을 교환하여 사용할 수 있습니다.)

미네랄오일과 사용이 가능합니다.

R22 에 비해 50%의 충전으로도 충분한 경제적인 유지가 가능합니다.

R22 에 비해 2.5% 이상의 냉동능력이 있으면 15%~20% 에너지 절감효과가 있습니다.

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냉매설비분야



HCR-600a(R-600a)

(High purity isobutan-99.5%, 99.9%, 99.99%)



Applicable Machines

Refrigerant for
small and medium air conditioners and refrigerators
Propellant for medicines,
cosmetics, perfumes, sprays and cleaners

Property		HCR-600a	HCFC-22
1. Molecular Mass		58.12	86.48
2. Boiling Temperature (℃)		-11.76	-40.76
3. Heat of Vaporization at 0℃(kj/kg)		355.7	234.12
4. Stabilities	Thermal	Stable	Stable
	Chemical	Stable	Stable
5. Erosive		No	No
6. Flammability(LFF & UFL, %)		1.8-8.4	None
7. Auto ignition Temperature(℃)		462	None
8. Toxity		No	No
9. O.D.P(Ozone Depletion Potential)		0	0
10. G.W.P(Global Warming Potential)		3 max	1,500
11. Lubricant		Mineral	Mineral
12. Specific Gravity		0.56	1.19
13. Packing method		CAN–200g 실린더–5kg,10kg, 50kg, 450kg, 벌크–10,000kg	

HCR-600a is widely used refrigerant in EU countries, especially in Germany. Very low ODP and GWP is the major advantage of this refrigerant.

Therefore, HCR-600a is preferred refrigerant for refrigerators supplied to EU countries. Bosch and Siemens have used HCR-600a for many applications and other refrigerator manufacturers follow.

Hanyoung Technochem possesses a licensed technology to elevate the purity of isobutan to optimize the efficiency of HCR-600a.

HCR-600a has been used in Korea for refrigerators to be shipped to EU countries.

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냉매설비분야



HCR-22a(R-433b)

(Replacement for R-22)



Applicable Machines

Refrigerant for medium and large
air conditioners, industrial refrigerators,
and commercial show-cases,
large air conditioning system for
hotels, hospitals, department-stores

Property		HCR-22a	HCFC-22
1. Molecular Mass		44.49	86.48
2. Boiling Temperature (℃)		-42.7	-40.76
3. Heat of Vaporization at 0℃(kj/kg)		324.95	234.12
4. Stabilities	Thermal	Stable	Stable
	Chemical	Stable	Stable
5. Erosive		No	No
6. Flammability(LFF & UFL, %)		3.2~9.5	None
7. Auto ignition Temperature(℃)		520	None
8. Toxity		No	No
9. O.D.P(Ozone Depletion Potential)		0	0
10. G.W.P(Global Warming Potential)		3 max	1,500
11. Lubricant		Mineral	Mineral
12. Specific Gravity		0.505	1.19
13. Packing		CAN–200g 실린더–5kg,10kg, 50kg, 450kg, 벌크–10,000kg	

Benfits of HCR-22a

1. Economics
HCR-22a costs 40 % of R-22 and saves power for compressors by 15-30%.

2. Safety
HCR-22a has been used for many applications in Southeast Asia and accepted and proven as a safe refrigerant at the market. Compressor noise level is lower.

3. Environment friendly
HCR-22a refrigerant as a mixture of hydrocarbons reduces global warming and ozone depletion and meets the international standards as an environment friendly refrigerant.

4. Lubricants compatibility
HCR-22a decomposes no lubricant and is compatible with any kind of lubricants used.
HCR-22a can be used with current lubricants without change.

5. Compatible with R-22
HCR-22a can substitute and replenish the existing R-22 with no modification of the machine.

6. Refrigeration efficiency
Lower specific gravity (42%) of HCR-22a reduces the weight of the refrigerant required for the same duty. Power saving for the cycles is expected 15- 30%.

7. Higher pressure, easier injection
The higher injection pressure eases the job.

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냉매설비분야



HCR-134a(R-436a)

(Replacement for R-12 or R-134a)



Applicable Machines

Refrigerant for
automobile air conditioners, vending machines,
small and medium sized room air conditioners, and
water purifiers

Property		HCR-134a	HCFC-12	HFC-134a
1. Molecular Mass		57.9	120.93	102.03
2. Boiling Temperature (℃)		-34.5	-29.8	-26.5
3. Heat of Vaporization at 0℃(kj/kg)		367	149.8	198.7
4. Stabilities	Thermal	Stable	Stable	Stable
	Chemical	Stable	Stable	Stable
5. Erosive		No	No	No
6. Flammability(LFF & UFL, %)		3.7~9.5	None	None
7. Auto ignition Temperature(℃)		540	None	None
8. Toxity		No	No	No
9. O.D.P(Ozone Depletion Potential)		0	1	0
10. G.W.P(Global Warming Potential)		3 max	8,100	1,300
11. Lubricant		Mineral/Ester	Mineral	Ester
12. Specific Gravity		0.531	1.31	1.21
13. Packing		CAN–200g 실린더–5kg,10kg, 50kg, 450kg, 벌크–10,000kg		

Benfits of HCR-134a

1. Economics
HCR-134a costs 40 % of R-12 & R-134a and saves power for compressors by 15-30%.

2. Safety
HCR-134a has been used for more than 800 thousand car aircons since 1997 in Korea and accepted/proven as a safe refrigerant at the market. Compressor noise level is lower.

3. Environment friendly
HCR-134a refrigerant as a mixture of hydrocarbons reduces global warming and ozone depletion and meets the international standards as an environment friendly refrigerant.

4. Lubricants compatibility
HCR-134a decomposes no lubricant and is compatible with any kind of lubricants of esters and mineral oils. HCR-134a can be used with current lubricants without change.

5. Compatible with R-12 and R-134A
HCR-134a can substitute and replenish the existing R-12 or R-134a with no modification of the machine.

6. Refrigeration efficiency
Lower specific gravity (41%-44%) of HCR-134a reduces the weight of the refrigerant required for the same duty. Power saving for the cycles is expected 15- 30%.

7. Higher pressure, easier injection
The higher injection pressure eases the job.

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냉매설비분야



HCR-502a(R-433a)

(Replacement for R-22 and R-502a)



Applicable Machines

Refrigerant for ultimately low temperature,
cold storages & warehouses,
refrigerator trucks
and commercial show-cases.

Property		HCR-502a	HCFC-22	HFC-502a
1. Molecular Mass		43.6	86.48	111.63
2. Boiling Temperature (℃)		-45.02	-40.76	-45.3
3. Heat of Vaporization at 0℃(kj/kg)		371.14	234.12	147.03
4. Stabilities	Thermal	Stable	Stable	Stable
	Chemical	Stable	Stable	Stable
5. Erosive		No	No	No
6. Flammability(LFF & UFL, %)		3.2~9.5	None	None
7. Auto ignition Temperature(℃)		520	None	None
8. Toxity		No	No	No
9. O.D.P(Ozone Depletion Potential)		0	0	0
10. G.W.P(Global Warming Potential)		3max	1,500	6,200
11. Lubricant		Mineral	Mineral	Mineral
12. Specific Gravity		0.507	1.19	1.07
13. Packing		CAN–200g 실린더–5kg,10kg, 50kg, 450kg, 벌크–10,000kg		

Benfits of HCR-502a

1. Economics
HCR-502a costs 50 % of R-22 & R-502a and saves power for compressors by 15-30%.

2. Safety
HCR-502a has been used for many applications and accepted and proven as a safe refrigerant at the market. Compressor noise level is lower.

3. Environment friendly
HCR-502a refrigerant as a mixture of hydrocarbons reduces global warming and ozone depletion and meets the international standards as an environment friendly refrigerant.

4. Lubricants compatibility
HCR-502a decomposes no lubricant and is compatible with any kind of lubricants used.
HCR-502a can be used with current lubricants without change.

5. Compatible with R-22 and R-502
HCR-502a can substitute and replenish the existing R-22 & R-502a with no modification of the machine

6. Refrigeration efficiency
Lower specific gravity (43%-47%) of HCR-502a reduces the weight of the refrigerant required for the same duty. Power saving for the cycles is expected 15- 30%.

7. Higher pressure, easier injection
The higher injection pressure eases the job.

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HCR-134a Injection Procedure

Preparation

1) Handling flammables, any ignition source must be removed and work place should be well ventilated before/during injecting refrigerant.
2) Air conditioner stays in operations to confirm the machine operating condition below before injecting refrigerant.
- Check if compressor pressure shows normal or not. (Please refer to recommended pumping pressure).
- Check if condenser and cooling fan are normal or not. (High pressure hints out of order).
- Check if the temperature sensor is correct or not, and confirm the room temperature and on/off state temperature of the compressor.
- Check if the purification filter is blocked or not, and if bypass between cold/warm side is leaked or not.

Injection of Refrigerant



1) Injection by Weight (by use of an electronic scale)
The required quantity of refrigerant recommended according to vehicle model is injected.
HCR-134a is lighter, so just inject 44 % of R-134a or 41 % of R-12. Be careful not to overcharge it.
* Please confirm the pressure reaches as recommended below or not.

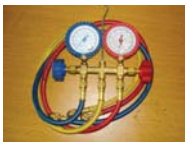


2) Injection by Volume (injection by use of volumetric cylinder)
Estimate the required quantity of refrigerant injection at 25℃ recommended according to vehicle model and adjust the thermal expansion factor by the table.
(e.g. 500 cc at 25℃ is equal to 500/0.967, 517 cc at 35 ℃)

●Temperature Conversion Table

Temperature(℃)	0	5	10	15	20	25	30	35
Conversion Value	1.061	1.049	1.034	1.022	1.011	1	0.996	0.967

Refrigerant Injection Quantity = Refrigerant Injection Quantity recommended according to vehicle model /Temperature Conversion Value
* Please confirm the pressure reaches as recommended below or not.



3) Injection by Pressure (Injection by use of a manifold pressure gage)
- Open the high pressure valve of manifold, after evacuation, to be 50 PSI. Then start the air conditioner and adjust the injection amount by ensuring the high/low pressure as per the recommended pressure at the table below. Finally confirm if cooling is enough or not after expansion valve and in the car.

●Pressure indication of the manifold gauges by air conditioner operating condition

Pressure	High pressure(PSI)	Low pressure(PSI)	Note
Normal	200~300	20~25	Summer
Normal	180	15~25	Spring, Fall
Insufficient refrigerant injected	130~160	10	
Excessive refrigerant injected	270	35	
Refrigerant contaminated by air	355	35	
Refrigerant contaminated by moisture	100~230	20	

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HC Refrigerants



Refrigerants manufacturing plant



Refrigerants
(Environment-friendly refrigerant)

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